

**CLAIMS**

What is claimed is:

1. A system for converting input image data in a first color space to output image data in a second color space, wherein said second color space comprises an RGBW format, said system comprising:
  - a converter for calculating chroma/luma values and calculating hue angle of said input image data from a first color space;
  - a hue angle triangle calculator, said hue angle triangle calculator determines in which chromaticity triangle the input data resides;
  - a matrix multiply unit, said unit multiplying the input data with a conversion matrix selected depending upon the chromaticity triangle determination.
2. The system of Claim 1 wherein said converter further comprises a means for calculating the absolute value of chrominance data from said input image data.
3. The system of Claim 2 wherein said converter further comprises a means for determining the octant of the hue angle of the input image data.
4. The system of Claim 3 wherein said converter further comprises a means for swapping the x and y chroma values, depending upon the results of a test condition.
5. The system of Claim 1 wherein said matrix multiply unit further comprises means for selecting at least one 3x3 matrix for converting said input image data.
6. The system of Claim 1 wherein said matrix multiply unit comprises a means for calculating a plurality of chromaticity triangle conversions and a multiplexor for selecting one of said plurality of chromaticity triangle conversions.

7. The system of Claim 1 wherein said system further comprises:  
out of gamut detection unit; and  
gamut clamping unit to clamp the gamut of detected out of gamut image data.
8. The system of Claim 7 wherein said gamut clamping unit computes the the ratio of  
the width of the color-space relative to the maximum component of the out-of-gamut color.
9. The system of Claim 1 wherein the color primaries and white point of said input  
color data are identical to the sRGB standard.
10. The system of Claim 1 wherein the color primaries of said input color data are not  
known, and said system converts said input color data to CIE XYZ and into RGBW data.
11. A method for converting input image data in a first color space to output image  
data in a second color space, wherein said second color space comprises an RGBW format, the  
steps of said method comprising:  
calculating chroma/luma values and calculating hue angle of said input image data from a  
first color space;  
determining which chromaticity triangle the input data resides;  
multiplying the input data with a conversion matrix selected depending upon the  
chromaticity triangle determination.
12. The method of Claim 11 wherein said step of calculation further comprises  
calculating the absolute value of chrominance data from said input image data.
13. The method of Claim 12 wherein said step of calculating further comprises  
determining the octant of the hue angle of the input image data.
14. The method of Claim 13 wherein said step of calculating further comprises  
swapping the x and y chroma values, depending upon the results of a test condition.

15. The method of Claim 11 wherein said step of multiplying further comprises selecting at least one 3x3 matrix for converting said input image data.

16. The method of Claim 11 wherein said step of multiplying further comprises calculating a plurality of chromaticity triangle conversions;  
and selecting one of said plurality of chromaticity triangle conversions.

17. The method of Claim 11 wherein said method further comprises:  
detecting out of gamut condition; and  
clamping the gamut of detected out of gamut image data.

18. The method of Claim 17 wherein said step of clamping further comprises:  
computing the the ratio of the width of the color-space relative to the maximum component of the out-of-gamut color.

19. The method of Claim 11 wherein the color primaries and white point of said input color data are identical to the sRGB standard.

20. The method of Claim 11 wherein said method further comprises converting said input color data to CIE XYZ and into RGBW data.